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Established 1835

Railway & Commercial Gazette

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LONDON, DECEMBER 26, 1952

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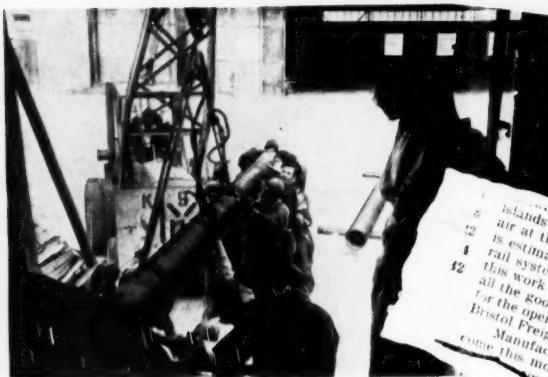


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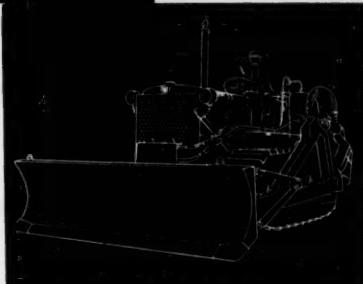


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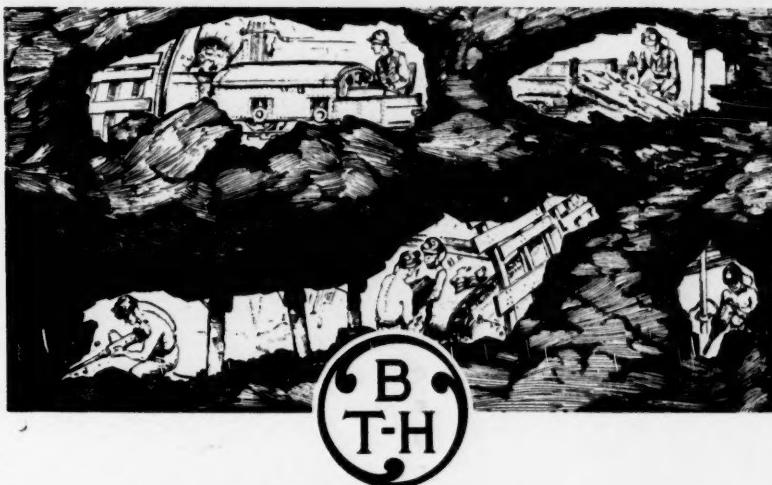
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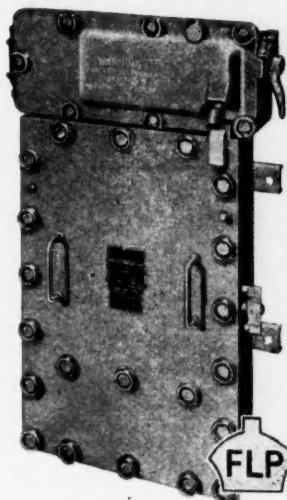
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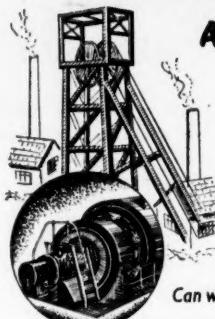
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The Mining Journal

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NOTES AND COMMENTS

World Nickel Position Reviewed

Reviewing the world nickel situation in his usual year-end comment, Dr. John F. Thompson, Chairman of the International Nickel Co., said that the accelerated expansion of existing production facilities and the advent of new and potential producers were the 1952 highlights of the free world's nickel industry.

He estimated the free world output of nickel in 1952 at about 315,000,000 lb., representing an increase of some 20,000,000 lb. compared with the total produced in 1951. Yet in spite of this appreciable expansion, Dr. Thompson reported that nickel supplies were still inadequate to meet large Government stockpile objectives simultaneously with unrestricted civilian consumption and the requirements of defence programmes—a situation which inclines him to believe that there is little likelihood that allocations made through the I.M.C. would be ended in the near future.

The current metal shortage has led to the search for new nickel deposits at unprecedented rate. This exploration work is being carried on by interests new to the industry as well as by the established producers. Most of this work, he said, is being financed by private capital but some of it is being undertaken with the financial assistance of the United States and other Governments.

The largest of the development projects now under way is International Nickel's own \$150,000,000 programme, financed entirely from its own resources at Sudbury, Northern Ontario, which is expected to be completed next year. This will give the company an annual capacity of 13,000,000 tons of ore entirely from underground operations thereby ensuring the maintenance of its current yearly rate of approximately 250,000,000 lbs. of refined nickel. Other important production programmes now being carried out include the Falconbridge Nickel Mines expansion programme in N. Ontario designed to give the company an annual capacity of 35,000,000 lb. in 1954; United States Government-financed Nicaro nickel project in Cuba, which is reported to be approaching its goal of 30,000,000 lb.

annually; the Sherritt Gordon Mines' production programme at Lynn Lake, Manitoba, which involves the construction of a 17,000,000 lb. annual capacity refinery scheduled for completion in 1953; and finally, the nickel mines operated by the French firm, S.A. le Nickel, in New Caledonia, which are reported to be producing some 14,000,000 lb. a year and are currently being modernized. When these schemes, and others still in the preliminary stages, are all completed the supply position for nickel should be a good deal easier than it is currently.

However, until these projects have been completed, strong support will be forthcoming for Dr. Thompson's conclusion that "the nickel requirements of the free world during the present emergency will continue to impose upon the industry the dual obligation of maintaining the highest possible production and promoting the most efficient use of every pound of nickel produced."

Iron and Steel Industry May Meet All Demands In 1953

For all engaged in the iron and steel industry the year is closing on an optimistic note. The target for 1952—an output of 16,000,000 ingot tons has been slightly exceeded and steel production is expected to rise to the unprecedented figure of 17,500,000 tons in 1953. In a few months the first post-war development plan which has cost over £300,000,000 will be completed, and a beginning will be made upon a second five year plan estimated to cost a similar amount. Already projects proposed by 46 companies at an estimated cost of £151,000,000 have been approved and the ultimate aim is the further expansion of steel production to 20,000,000 tons per annum, for which purpose it is intended to increase blast furnace capacity to 15,000,000 tons.

Producers appear to entertain no qualms about marketing these huge prospective outputs and it is certainly a point in their favour that British prices compare favourably with those of foreign competitors. The vigorous export drive foreshadowed by the Chancellor of the Ex-

chequer will be nourished by ampler tonnages of iron and steel and by the same means increased productivity in many vital home industries will be encouraged. By increasing pig iron usage the difficulties arising from the shrinkage in scrap supplies are being rapidly overcome and in the next five years it is proposed to increase blast furnace capacity by a further 4,000,000 tons. Meanwhile, however, pig iron is still scarce. Maximum outputs are being promptly consumed and there is no surplus available for export though enquiries from abroad are persistently circulated.

Yet another favourable outcome of the expansion of steel production is the curtailment of imports of foreign material. Imports of iron and steel which have been running at a high level throughout the year and have involved a heavy drain on gold and dollar reserves, touched their lowest point last month and exports were on a rather better scale. The most pleasing feature, however, is the increase in the allocations of steel to home consumers for the first quarter of 1953. No doubt in many instances these fall short of maximum requirements but it is manifest that industry is entering upon a period of steady progress towards the equalization of supply and demand for all classes of iron and steel products.

World Information Centre for Dust Suppression

On December 17 last, thirty delegates from sixteen countries concluded a seventeen-day meeting on the suppression of dust in mining, tunnelling and quarrying operations. The meeting was convened by the International Labour Organization, a specialized agency associated with the United Nations, and the assembled experts proposed in their report to the governing body of the I.L.O. that the Organization become a world centre for the collection and dissemination of information on the subject of dust suppression in the three specific operations.

Brazilian Magnesite

(From Our Own Correspondent)

Teresopolis, December 13.

Magnesita S.A., which exploits the Brumado deposits in Bahia, complains that the company has orders for 14,000 tonnes of dead-burned magnesite, but is unable to obtain adequate transport from the mines to the port of Salvador over the East Brazil Railway. Although 12,000 tonnes annually are scheduled for shipment to reputable manufacturers of refractory bricks in Europe, the railroad is only able to carry a small fraction monthly. As a result, instead of increasing production, the company has been obliged to shut down one of its three furnaces in Brumado and another will become inactive shortly unless the service is improved. The East Brazil Railway is now being electrified and re-equipped, but some months must elapse before any radical improvement can be effected.

Exports of magnesite are not listed separately in Brazil's foreign trade returns, but during the four months ended October 31, permits were issued to ship 1,991 tonnes to Germany from Bahia, 300 to Great Britain and 140 to Chile. The price averaged £15 11s. per tonne, f.o.b. Salvador.

DEPOSITS OF THE CRYSTALLINE TYPE

The magnesite deposits of South-west Bahia, mentioned in *The Mining Journal* of June 6, 1952, are all located in the Serra das Eguias, municipality of Brumado, and were discovered in 1939. The mineral is of the crystalline type, occurs in pre-Cambrian dolomite and is associated with

talc and rock crystals. According to Alfred Bodenlos, of the U.S. Geological Service, the deposits vary from 100 to 1,290 metres in length, 100 to 550 metres in width and have vertical ranges. The grade is very high. One large deposit, carefully sampled, averages only 4.2 per cent impurities, including less than 1 per cent CaO. Only two of the eleven most important deposits are ferruginous. In 1945 the Department of Mineral Production (D.N.P.M.), after exhaustive investigations, reported that "the reserves of magnesite are enormous and compare favourably in every way with the world's biggest known deposits."

Eight other occurrences are known in limestone formations in Central Ceará, in the vicinity of Iguatu, about 250 miles south of Fortaleza, the capital. Five are more than 1,000 metres in length, with widths varying from 150 to 500 metres. Mr. Bodenlos reported that the deposits consist of high-grade magnesite, the chief impurity being talc, which ranges from less than 0.5 to 21 per cent. Other impurities, including lime, average less than 2.5 per cent. In 1942 the D.N.P.M. estimated the Ceará reserves at between 200 and 300,000,000 tonnes. In that year 8,000 tonnes, calcined in rudimentary kilns, were exported.

In Ceará, as in Bahia, the mining companies are hampered by transport difficulties, aggravated in Ceará by inadequate port facilities. These problems were discussed by the National Council of Mines, and reported on by *Mineração e Metalurgia* in 1948. At that time it was stated that Magnesito do Brasil, one of the principal exploiting companies, had large quantities of mineral awaiting transportation to Rio and São Paulo. Since then the Rede Viação Cearense has received additional rolling stock and is about to undergo a general overhaul. Considerable sums have been, and are still being, spent on the port of Mucuripe.

Magnesite also occurs in the iron mines of Serra do Mariano, Municipality of Oliveira, in the western part of Minas Geraes. These deposits have been referred to in technical publications at intervals since 1832. They were acquired by a German company some 30 years ago, but the results of its investigations have not been disclosed. Neither iron nor magnesite can be exported at present owing to lack of rail communications.

Towards the end of 1951 the D.N.P.M. announced that a deposit of magnesite, extending for 130 metres and with a depth of 50 metres, was being investigated in Alagoas. After a preliminary examination the reserves were estimated at between 500,000 and 600,000 tonnes.

RECENT INDUSTRIAL DEVELOPMENTS

A Brazilian company, Proberil S.A., associated with American capitalists, has been formed to manufacture beryllium oxide at Rezende, São Paulo. Proberil has acquired one of the most important beryllium mines in Minas Geraes and will have an initial output of 80 tonnes annually. Sulphuric acid will be made in Minas Geraes.

A Ryley & Co., manufacturers of industrial diamonds, have applied for permission to install plant in Brazil.

Work has been started on the Mannesmann steel works at Belo Horizonte (see *The Mining Journal*, December 14, 1951). The plant will include extrusion mill, rolling mill and wire-drawing installations. The annual capacity will be 100,000 tons of steel ingots, to be raised to 250,000 tons when required. The Duesseldorf Company will supply engineers, foremen and skilled workmen.

As the Markets were closed over the Christmas holiday, our two regular features—Metals, Minerals and Alloys, and Mining Markets—are not appearing this week. They will be resumed in our next issue.

AIR SURVEY METHODS IN MINERAL EXPLORATION—II

Air Survey Methods in Mineral Exploration and Development

By P. A. RANKIN

In the first part of this article, which appeared in our issue of December 12, the author, who is the chief geologist of Hunting Aerosurveys Ltd., and Hunting Geophysics Ltd., London, explained the technical processes involved in the production of topographic, geological, geophysical, forestry and soil maps. In the following and concluding portion of his article, he begins by explaining something of the interpretation methods used in geological mapping and concludes by giving examples of four types of survey used in ore and oil search and development.

Photographs can give the surface geology, but where detail is obscured by alluvium, drift or forest cover, and where there is need to probe below the surface, geophysics can give the answer.

AIRBORNE GEOPHYSICS

There are many geophysical methods, each applicable to peculiar problems. Some of these methods lend themselves to aerial traversing, notably the magnetometer, scintillometer (radioactivity detector), electro-magnetic and radio methods.

The Airborne Magnetometer.—The magnetometer most commonly used to measure the variations of the magnetic intensity of the earth is of the induction type. Three fluxgates are mounted mutually at right angles in a detector head. The detector fluxgate is maintained in the direction of the earth's field by the other two which are null-seeking, i.e., they tend to maintain themselves at right angles to the earth's field. Lines of flux impinging on the end of the detector coil excite the coil producing a second harmonic current which, after amplification, actuates the recording pen of a continuous strip recorder of the Esterline Angus or Leeds Northrup type. As the aircraft flies along a continuous profile of magnetic intensity above, an arbitrary datum is made.

Operation.—Flight profile lines are planned at a spacing decided by the type of record needed. These lines are marked on a navigating map which may be of ordnance survey type or a photomosaic. The direction of these profile lines is generally at right angles to the main geological strike.

In order to control the recordings against the normal variation of the earth's field, the flying times of the profile lines are kept to a rigid maximum and lines at right angles, called control lines, are flown in order to tie the profile lines to a common datum.

After the necessary corrections have been made for daily variation, ground speed changes, scale changes, etc., using a "graph rectifier," points of the same intensity on the profiles are joined together to produce a magnetic contour map.

There are two main purposes for which the magne-

tometer is used. One is concerned with recording the variation of the magnetic field caused by near surface geology. This is applicable to mineral search. The other is concerned with recording the variations of the magnetic field caused by geological structures under deep sedimentary sections. This is applicable to oil search.

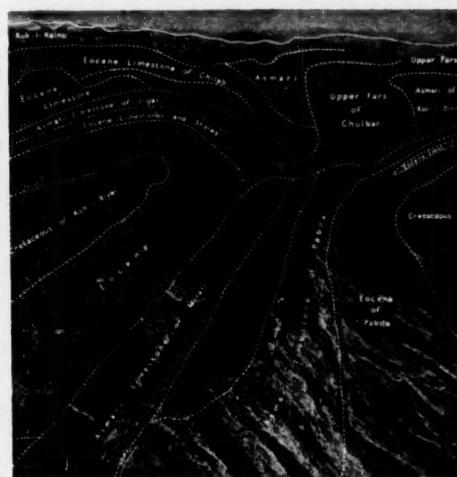
Mineral Search.—For this purpose, the magnetometer is flown at 500 ft. or less above the ground on a profile line spacing of $\frac{1}{2}$ to $\frac{1}{4}$ mile. A detailed record of the near surface magnetic picture is thus obtained. Important anomalous magnetic readings, "anomalies," are interpreted in geological terms using the fact that rock types have measurable susceptibility (or permeability) differences and the attitude and position of rock masses is reflected in the shape and magnitude of these anomalies.

Oil Search.—The basis of oil search, using the magnetometer, is that oil is found in thick sedimentary sections which have floors of metamorphic and igneous rock—so-called "basement complexes." The assumption is made that the sediments are, relative to the basement, non-magnetic. The magnetometer flown on lines 2 to 4 miles apart at a height of say 1,500 ft. above sea level (that is to say, for example, 5,000 ft. above the basement itself) records the magnetic

variations caused by the basement itself. These variations are caused by changes in basement topography and by changes in the rock types in the basement itself. Interpretation is directed to eliminating magnetic "anomalies" due to changes in the rock types and accentuating the variations due to changes in the basement topography. The resulting "residual" map reflects the topographic irregularities of the basement. If one can assume the structure of the overlying sediments reflects, in the main, those irregularities, one can drill for oil on "residual" high spots.

The Scintillometer.—The activated sodium iodide crystal emits light flashes when struck by gamma radiations. This property enables an electrical recording of the frequency of gamma ray bombardment to be made using a photoelectric cell.

This instrument is flown with the magnetometer on mineral surveys in order to locate general areas of radioactivity. Investigations are being carried out on the possi-



(Photo courtesy Hunting Aerosurveys Ltd.)
Geological survey can be greatly assisted by the use of oblique air photographs, which often show detail not visible on verticals. They are particularly valuable in mountainous country as is illustrated in the example above, taken in the Middle East during oil exploration

bility of identifying rock types by their radioactive mineral content, and on the relationship between radioactivity and oil accumulation.

Airborne Electro-magnetic Surveying.—An alternating current is passed round a copper cable looped around the belly of an aircraft. The field associated with this loop cuts through the earth and, where conductive features occur, the field is distorted. Recordings of this distortion are made from which an "electro-magnetic" map is produced. Conductive zones such as faults, shear zones, sulphide bodies, can thus be traced.

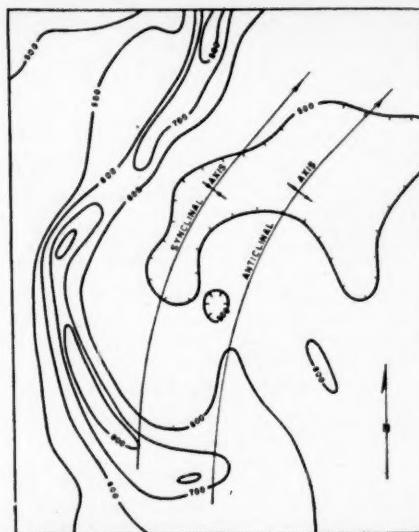
INTERPRETATION OF AIRBORNE MAGNETIC DATA

Two approaches to interpretation may be made. We may call them the "geological" and the "mathematical." Both have their fields of use.

The geological approach is that of deciphering the "magnetics" in terms of the known nearby geology. Naturally, where the survey is made to prove extensions of known magnetic ore bodies, interpretation is relatively simple. In areas where the geology is not known, both geophysical and photogeological data are used to produce the most reasonable geological picture. In order to check this laboratory interpretation, field work must follow. But, whereas by normal field methods the geologist does not know what to expect in unmapped areas, by using both photography and airborne geophysics, he is enabled to plan the field work and devote his field time to important areas.

The "mathematical" approach is of use in determining the position and size of buried geological features. Depths to blind ore bodies, the sizes of buried igneous plugs and dykes are examples. This approach finds its greatest use in surveys for oil and in giving detailed estimates for drilling to ore. In essence it must be statistical since no natural rock mass has constant magnetic characteristics.

No one would assert that magnetic prospecting is as precise as seismic prospecting for instance, but it can well be said that it is fast and relatively cheap, and can provide the first picture of the area on which to base more precise prospecting.

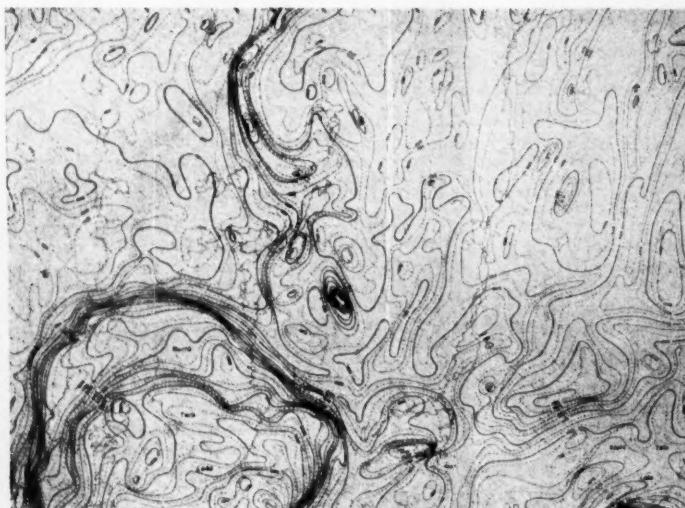


A belt of relatively magnetic volcanic rocks is outlined by the aeromagnetic contours in the west half of the map. The double curve toward the south is related to known folding, as indicated by the fold axes. Recorded at a flying height of 500 ft.

Some examples of aeromagnetic interpretation are shown in the above two figures.

SOME EXAMPLES OF AIRBORNE SURVEY RESULTS

1. *Regional Surveys*, intended as a basis for later intensive ground investigations.
2. *Specific Surveys* for extensions to known ore and oil areas.

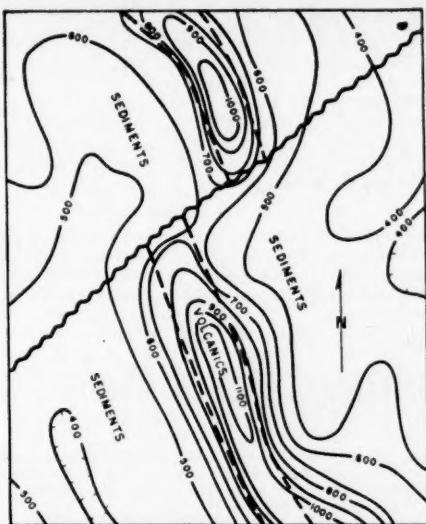


(Photo courtesy Aeromagnetic Surveys Ltd.)

An aeromagnetic map of the same area at a scale of approximately 2 in. to 1 mile. Details of its production include a colour interval of 25 gamma, a mean flight line spacing of 1,320 ft., and a mean terrain clearance of 500 ft.



A mosaic of part of the survey of some illustrations show how aeromagnetic and map with ver-



An exceptionally clear example showing a faulted, magnetic lava horizon. The accompanying offset in its magnetic anomaly equals the apparent horizontal displacement as determined by geological mapping

3. "Follow-up" Surveys for development of the minerals found.
4. By-Product Surveys intended to show how aerial photography undertaken for specific purposes may be later used for the social development of the areas concerned.

In Regional Mineral Surveys

- (a) Photographic interpretation was recently undertaken to provide a reconnaissance geological map of a concession



Photo courtesy Aeromagnetic Surveys Ltd.)

600 sq. miles in Newfoundland. These three photographic methods can produce a detailed little ground work



(Photo courtesy Aeromagnetic Surveys Ltd.)

A geological interpretation at a scale of approximately 2 in. to 1 mile, compiled from aeromagnetic data and aerial photographs. Based on geological surveys of the same area completed by the Newfoundland Government

area in Northern Rhodesia in the search for base metals. This area is mainly swamp and, where dry land exists, it is covered by a deep mantle of residual soil, yet it was possible to depict the trend of the strata and to indicate possible faults and rock contacts. A mosaic was provided at a scale of 1:15,000 for use by the field crews. The interpretation map was traced on to transparent sheets which fitted the mosaic.

(b) Photographic interpretation provided a detailed geological map of part of the Jos plateau in Nigeria used in the search for tin.

(c) Exploration in the Middle East for oil was greatly aided by interpreted photography, and the illustration on page 735 gives an indication of the type of map that is produced.

(d) A survey of some 4,800 sq. miles in Newfoundland, using both aeromagnetic and photographic methods, was undertaken in 1950. (See illustrations below).

(e) Aeromagnetic surveys of large areas have been used as a basis for subsequent work in potential oil areas in Canada and recently in the Brahmaputra basin of Pakistan.

In Specific Mineral Surveys

(a) Aeromagnetic surveying has been used successfully to prove extensions to the iron ore fields of the Mesabi Range, U.S.A.

(b) The great Labrador iron ore fields are being extended using the airborne magnetometer.

(c) The Marmora magnetic deposit—a blind ore body under about 300 ft. of limestone—was discovered by the airborne magnetometer.

(d) Aeromagnetics have been used to find ilmenite ore in association with anorthosites in Canada. The ilmenite is found in areas of low magnetic relief which are thought, by some, to be due to the low magnetic susceptibility of ilmenite relative to the anorthosite, but by others to be due to inverted polarity.

(e) The airborne magnetometer confirmed the existence of an extensive titanium deposit in the Mealy Mountains, Labrador.

(f) Cerro Bolivar, the large iron hill of Venezuela was found using aerial photography.

(g) Ring dykes have been found and mapped in detail in parts of Africa directly by photographic interpretation

(h) Aerial photographs have been used in many parts of the British Isles and abroad to unravel the structures of igneous complexes.

Follow-up Surveys

Using photography that was flown specifically for geological exploration, topographic maps can be produced. These maps may be used for siting factories, power houses, townships and communications, all of which are necessary to the production of ore or oil found in the exploration stage.

By-Product Surveys

As communities develop around producing mines, there is a great need to plan for their existence. Studies of, for example, soil types, natural drainage and irrigation schemes to find (and exploit) the best areas for growing crops and keeping livestock; studies of the timber resources for producing necessary building material, may be mentioned in this regard. These studies can be materially helped by interpreted aerial photography.

CONCLUSION

Whilst it is not claimed that aerial surveying is the complete answer to all mapping requirements, it is felt that people concerned with mining will be interested to know what aerial survey can do and how it can help in their problems.

Practical Notes on Smelting Nickel Ores

By C. C. DOWNIE

In the opening paragraphs of the following article, the author compares the efficiency of electric hearth and blast furnace practice in the smelting of nickel ores. After a discussion of constructional details in connection with air blast, he ends by drawing the conclusion that provided reliable air blast conditions exist and a straight run of the same briquettes are used, the total costs of air blast practice remain less than those incurred by electric smelting.

The gangue material present in nickel ores of the garnierite order, and largely represented by serpentine, for many years offered no small difficulties in the initial smelting process. On the one hand, electric smelting could readily get round all obstacles in the matter of easy fusion, but appears to have only been resorted to somewhat unwillingly as the costs, compared with blast furnace practice, are much greater.

ELECTRIC HEARTH v. BLAST FURNACE PRACTICE

The furnace efficiency of the electric hearth can reach some 85 per cent, whereas the blast furnace rarely attains 30 per cent efficiency, and more frequently ranges from 30 to 50 per cent. Heat losses with the electric hearth are reduced to the absolute minimum, whereas in the blast furnace, the need for water-jackets means that a continual source of heat-loss must be suffered from this feature alone, apart from what passes to the flues. This conservation of heat, translated into energy on the part of the electric furnace, however, is small compensation for the relatively high cost of electric current, even when linked-up with extremely heavy bus-bars directly to adjacent hydro-electric schemes. (The idea lying behind the use of heavy bus-bars was to obviate as far as possible the need for transformers.) In reviewing the subject generally, the absence of sulphur in the original ore proved to be only an apparent, and not a real, advantage, when endeavouring to make a ferro-nickel alloy directly. With blast furnace smelting, the coke invariably contains sulphur, and although producing a metal containing some 65 per cent nickel, this still retains some nickel matte.

In electric furnace smelting the resulting alloy shows little evidence of matte, provided pure garnierite alone is handled, but sooner or later some minute amount of nickel pyrites appears, and produces a modicum of sulphide to the extent of a few points per cent. The removal of this using a calcium carbide slag, while comparatively simple, appreciably increases the time which the costly high amperage current has to be employed, and at a period when the full heat is being transmitted to the furnace roof. Provided a straight run of the same class of ore prevails, and thereby allows the full capacity of an existing blast-furnace design to be utilized, electric smelting can bear no comparison in the matter of costs, except where a ferro-alloy acceptable to steelmaking can be regularly pro-

duced. (Pure nickel from either electro-refining or the carbonyl processes has almost entirely outclassed ferro-nickel for making the best nickel steels, which alloy to-day is rarely considered acceptable for the best specifications.) The ore is carefully sorted from the associated serpentine, and is sometimes hand picked, but even so still retains this gangue, and is graded into lots which are sampled and marked prior to shipping. Admixtures of lower grade material containing under 4 per cent nickel with richer material to give an average 6 per cent nickel content, frequently becomes necessary because of the lack of uniformity. This in turn reflects on the smelting, and while offering no hazard to the electric hearth, means that the greatest care is necessary in the selection of coke and application of air-blast with the blast furnace.

Details of this blast, although given freely in connection with copper smelting, are but rarely quoted in connection with nickel smelting. A survey of different hearths used revealed that where the much more fusible pyrite material was handled, a totally different furnace blast sufficed. Although the rectangular construction is considered more favourable than the cylindrical design for most hearths, the hearth area has in each instance to be provided with a definite number of cu. ft. of air per minute per sq. ft. of this area. The difference which the grade and character of the ore exerts is seen in the different blasts actually used.

CONSTRUCTION IN RELATION TO AIR-BLAST

The hearth area of one furnace was 44 x 266½ in., or 3,666 x 22,208 ft., giving a total of 81.2 sq. ft., and for which the blast required was 25,000 cu. ft. per minute at from 24 to 28 oz. gauge, which worked out at 307 cu. ft. per minute per sq. ft. of hearth area. Another furnace dealing with magnetic pyrites used a hearth of 44 x 180 in., totalling 55 sq. ft., and the blast for which was 15,340 cu. ft. per minute at 40 oz., and which requiring 175 h.p. to drive the blower, worked out at 278 cu. ft. per sq. ft. of hearth area. A third furnace, which dealt not only with highly refractory material, but directly with ores in fine condition required a much greater blast. Using a hearth of 44 x 98 in. giving an area of 29.8 sq. ft., the blast required was 14,500 cu. ft. per minute, which worked out at 486 cu. ft. per sq. ft. of hearth area.

On the other hand, where conditions had been established for a uniform run of ore, a hearth of 44 x 396 in., giving an area of 121 sq. ft., required a blast of 20,000 cu. ft. per minute at 14 oz., thus amounting to 165 cu. ft. per sq. ft. of hearth area. By dint of using soundly made briquettes, smaller 50 ton furnaces handling garnierite ores were found capable of successfully smelting these with very reduced blast, and which to some extent reflected on the systematic fluxing engaged. Two of these, each of 19.1 sq. ft. hearth area, totalling 38.2 sq. ft., required a blast of only 6,000 cu. ft., working out at 158 cu. ft. per sq. ft. of hearth area. It was found that these conditions could not be simulated on the larger 200 ton furnaces, which, with a hearth area of 73.3 sq. ft. required 22,000 cu. ft. per minute at 24-28 oz., or 300 cu. ft. per sq. ft. of hearth area. For driving the blower for this furnace, the turbine used consumed approximately 4,000 lb. steam per hour, which at an indicated horse power of 200, worked out at 20 lb. steam per i.h.p. The blast jackets were erected in two tiers, with the lower units 7 ft. high, and the upper jackets 7½ ft. high, using selected metal approximately $\frac{1}{2}$ in. thick. This gives a brief résumé of how much importance is attached to furnace blast, and which has had to be varied according to the disposition of the ore from time to time. Using the best coke with a calorific value of some 7,000 B.Th.U. a considerable saving in fluxes for the briquettes accrues provided this proper furnace blast is maintained. It is equally important that the downtime does not introduce any constriction, and which involves fresh calculations where another size of hearth has to be erected. As this has been previously dealt with, it is only quoted in brief detail. Using 3 in. brickwork inside the metal shell of the downtime, the internal diameter was varied from 5½ ft. to 6 ft., and eventually 6½ ft., and the velocity in the downtime was increased from 3.34 to 3.93 ft. per second.

Given these conditions, the free flow of gases from the furnaces ensures the products of combustion making easy egress to the scrubbers, while the favourable blast raises ample heat to fuse the mass to a thin light slag from which the matte separates without any tendency to adhere. In order to check small pressure differences, manometers of the inclined draught gauge type were at first used, but were later replaced by the more accurate micro-manometer gauges. The latter measure the draught in flues, and downtime takes by means of a Pitot tube, where a sensitive reading accurate to 0.01 in. in small pressure differences up to 1 in. water is required. For standardization purposes, an alternative gauge used was the Chattock-Fry tilting arrangement for pressures up to 1.5 mm. of mercury, and which had a sensitivity of 0.0001 mm. of mercury. This was found necessary in view of the disposition of the different furnaces, and their connections to scrubbers and stacks, and as a means of checking the performance of existing gauges. The composition of the gases is ascertained by the usual Orsat apparatus, no automatic testing devices were used, but periodical tests were made of the arsenic content, and some of the rarer constituents.

WORKING FRESH CHARGES

In view of the knowledge that the electric hearth would become a serious competitor in succeeding years, provided costs for electric current could be reduced, every effort has been made to expedite the performance of existing blast furnaces. It is known that even Japanese undertakings have installed electric furnaces, but there is no published evidence of hearths for working 200 tons per 24 hour day, as with the blast furnaces quoted above, and up till now electric furnaces engaged in New Caledonia are stated to be much smaller. The relative costs are difficult to

arrive at to acquire a true criterion, where fresh types of ore are under consideration, since in blast smelting, using the best cokes with calorific values of from 7,000 to upwards of 7,100 B.Th.U. and the ideal air-blast conditions, the remaining problems devolve upon fluxes used in the briquettes. In electric smelting, literally no fusion problems exist, as all materials will melt under the arc.

With blast smelting, fluxes and barren materials have to be balanced against costs of coke, besides any time-loss which might be experienced, although in actual practice the latter contingency rarely arises.

When ore from some fresh deposit comes to hand for the first time, a proportion of the charge is made to include this as prepared briquettes, and a record is taken of any change in output which transpires, followed by increasing this proportion. When blowing-in the large blast furnace, i.e., starting afresh where the new material has to be dealt with, the first charge is simply foul slags, which are thinned by addition of iron pyrites. In so doing, part of the iron is oxidized, and in combining with the silica of the slag, usually assists in reducing the melting point.

ONCE THE SLAG IS RUNNING WELL

Once the slag is running well, about a quarter the usual proportion of briquettes is added to the slags worked, and tests reveal if the heat is being properly imparted. In the 200 ton blast furnace, the full 22,000 cu. ft. per minute blast at some 24 oz. gauge is applied, while the proportion of briquettes is increased to upwards of half of the normal charge. The briquettes are charged on top of the coke, and are followed by the foul slags, which in running over the former, facilitate ready fusion, and if all is well at this stage, the full complement of briquettes alone is then introduced. However, should there be any defect at this stage, there is no alternative but to continue with the reduced proportion of briquettes, with the remainder of the charge made up of slags, until an alternative briquette composition can be included. It is here that the advantage of having different briquette compositions on hand reveals itself, since one can be worked against another, and render the whole mass readily fusible. As an alternative, roasted matte and converter toppings can be run through to thin-out the mass, where the slag appears to be unduly sluggish, and as a last resort, these mediums can be worked alone as a charge where the furnace bottom appears to be building-up.

Where the bottom tends to still remain built-up, resort is made to passing through an arsenical charge. Arsenic, and particularly antimony, are amongst the best known mediums for ensuring a clean furnace bottom, with almost any nickel charge, but, of course, add to the difficulties of maintaining hygienic conditions in the converter house, and hence are utilized as sparingly as possible. (What little content of the platinum metals, and particularly iridium exists, tends to find its way to the furnace bottoms, and which are chipped out at vacation periods, sampled, bagged, and sold.) Loose ganister is added to the furnace bottom and baked into the surfaces at vacation periods, and although basic linings had been tried, these were not persevered with. Once the furnace is in full working operation, charging is done in the ratio of 32 cwt. briquettes to 9 cwt. coke, and with easily fluxed ores, the ratio of fluxes to the latter is approximately 1 to 7.

Thus the consumption of coke can be caused to vary from many different reasons, apart from uneven packing within the hearth, and represents the main running cost item which is always under survey, but provided reliable air-blast conditions and a straight run of the same briquettes are used, total costs still remain cheaper than electric smelting.

CORRESPONDENCE

RECRUITMENT AND TRAINING OF MINING ENGINEERS

To The Editor, *The Mining Journal*.

Sir,—I write to comment on two closely related subjects dealt with in your issues of December 5 and October 24. One relates to the recruitment of young men into the mining schools with the object of entering the mining industry; the other to the nature of the training which they receive and how this should be divided between the schools and the industry itself.

In my opinion co-operation between the two parties on both these points is insufficient to a dangerous degree. It is true that certain mining companies individually or in groups offer a number of scholarships and post-graduate appointments, but these facilities lack proper co-ordination and there appears to be no attempt on the part of the industry to indicate its requirements either in numbers or in the nature of the training to be provided.

With the rapid growth of scientific knowledge the schools are faced with a difficult problem in deciding what to include in the curriculum. It is already overcrowded and, as you believe, "the modern science student is being taught too much technical know-how and too little about the fundamental processes of logical thought." With this view I am in complete agreement. Obviously no more can be introduced into a course of the present length, and to add to the length is undesirable for many reasons both economic and social. Apart from these, it does not appear to me to offer an acceptable solution. The eventual progress of the student will not depend on "cramming" in current techniques which may soon become obsolete but on a basic training in pure science and in "processes of logical thought" which will enable him to keep abreast of progress and to solve the new problems which will present themselves.

I feel that, in the schools, there is still surviving some influence from the days when mine-managers had to run all aspects of their job with little or no technical assistance from outside, and graduates were expected to be economic wage-earners from the start. Conditions have changed and educational plans must change with them. If the industry is to get the type of training it wants it must make its requirements known to the schools and, if I am right in my assumptions, must be prepared to give employment at a living wage while the young engineer is acquiring experience of current technique. In this period the more promising may be provided with the opportunity for post-graduate study, or training in management. Unless there is this degree of co-operation and sharing of responsibility the problem appears insoluble.

I have been discouraged by the attitude adopted in some academic circles that practical experience in operation and management is unnecessary for the occupant of a Chair of Mining. This may seem inconsistent with what I have said about training in current technique, but such experience is necessary to a knowledge of how the student should be trained to approach the problems of mining, which is an art and not an exact science.

The question of numbers involves special difficulties. The metal mining industry is quite unfamiliar to the great majority in this country and the great number of scholarships available in other vocations makes an easy appeal. This can only be overcome by an organized effort directed at the secondary schools to bring the advantages and prospects of a mining career prominently forward.

I hope that your suggestions for immediate action by a body or committee fully representative of the industry will get every support.

Yours faithfully,
ROBERT ANNAN,
December 15, 1952.

49 Moorgate,
London, E.C.2.

To The Editor, *The Mining Journal*.

Sir,—I was interested to see the leading note in your issue of October 24, in which you pose the question whether the responsibility of training for management should be placed on the mining school or upon industry.

The curriculum of a mining school is extensive, and indeed, already overloaded to an extent for the time given to the course. The object of such a school should be to provide an adequate theoretical background or foundation on which to build a thorough knowledge of the profession. Although the student will gain some practical knowledge during his course, he will, nevertheless, require several years of practical experience before he is fitted to take the post of manager or assistant manager of an important mining or metallurgical operation.

A man enters a mining school with the object of progressing in his profession—in many cases that object is to become a mine manager. Interest could be stimulated by some lectures on the subject of management at the school, but the real training of mine management would be better left until the individual has had the necessary practical experience, in order better to appreciate what is required of a manager.

Thus, I would agree that the subject of management training falls upon industry.

We, in our Group have accepted the position that improvement in control can be attained by what is termed Training Within Industry.

Personally, I hold the opinion that the attribute of leadership becomes apparent fairly early in a man's life, but support the view that such leadership can be improved by training.

We have put a large proportion of our officials through courses in Job Instruction, that is, training in how to give an order, and in Job Relations, in other words, personnel management, and are at present engaged in extending the courses to Job Methods and to a course on Management. This instruction is given to men in the executive positions from shift bosses up to underground managers. We have taken advantage of the services of an organization specializing in this class of training, namely, the National Development Foundation, with the object of procuring a sound basic instruction for suitable men in our organization who subsequently act as instructors within the Group.

Johannesburg Consolidated Investment Co. Ltd. Yours faithfully,
Fox & Harrison Streets, Johannesburg. K. RICHARDSON, December 6, 1952.

THE TAFT-HARTLEY ACT

To The Editor, *The Mining Journal*

Sir,—Are you not in error in your issue of November 7, page 513, in stating that Mr. Eisenhower is reported to have said that the Taft-Hartley Act must be repealed? The only comments that I saw during the campaign were to the effect that it must be amended, in which Mr. Taft himself concurs.

It is only a guess, but in regard to your comments on how far the individual labour union members followed the recommendation of their chiefs, some usually well-informed politicians that I have talked to figure that a minimum of 30 per cent of them broke away from the labour recommendations.

May I express to you as I have done once or twice before, my appreciation of *The Mining Journal*. It is a remarkable publication.

Yours faithfully,
DONALD M. LIDDELL.
December 4, 1952.

11, Broadway,
New York.

TECHNICAL BRIEFS

New Ore Concentration Method

The International Minerals and Chemicals Corporation of America, has announced the development of what is described as a "new and revolutionary" ore beneficiation process applicable to potash and phosphates as well as to many other types of ores. International is to build a new and larger pilot plant at Carlsbad, New Mexico, to treat continuously semi-commercial quantities of potash by the method. The method, known as the Lebaron-Lawyer process, is dry and utilizes neither reagents nor water.

Gold Extraction

A method for the extraction of gold from gold ore pulp or tailings has been claimed by F. E. Wilkinson (B.P. 658,638). To every pound of pulp three pints of cyanide solution containing 2.66 lb. per ton of solution is added. Hydrated lime is also added if necessary to neutralize any acidity in the pulp. The mixture is then heated to 110° F. and ozone bubbled through. At the same time a high frequency electromagnetic field is applied, the whole process being continued for one hour. By this method 70 per cent of the gold is dissolved in the form of the complex cyanide. The gold may then be recovered from this solution by conventional methods.

Wire Rope Heat Treatment

The manufacture and treatment of winding rope has been described by R. Saxon (*Min. Mag.* 86, 146, 1952). Winding rope is, in general, manufactured from acid or special acid quality iron ores. These, when converted into steel, yield a product which can be cold worked, without detriment to the resilience, so as to produce a high tensile strength. The annealing temperature may be as high as 950° to 1,050° C., and is followed within about 20 minutes by cooling in a lead bath to a temperature not below 400° C. Such treatment causes a satisfactory conversion of the austenite grains into pearlite. Of the tests which may be carried out on the wire, the author considers the torsion test to be most important since it will reveal defects which cannot be discovered by any other means.

New Australian Zinc Coating Process

A process claimed to permit a permanent zinc coating to be applied to any iron or steel structure before or after erection has been patented by Dimet Pty. Ltd. of Melbourne. The process involves the application by brushing of Galvanite, a compound containing metallic zinc and other inorganic products in a water-soluble metallic silicate vehicle.

Galvanite is usually applied to surfaces that have been descaled by sand-blasting or wire brushing. After application, the treated surface is heated to a temperature of between 300 and 400° F. to fuse the coating and render it insoluble in water. This low temperature is claimed to avoid the distortion which may be caused by ordinary galvanising. The process is said to give a weatherproof coating resistant to temperatures of up to 600° F. in air, water and petroleum. The coating is also claimed to be impervious to food and fruit acids.

Ultrasonic Waves in Flotation

T. Oyama and S. Tanaka state that oil in water emulsions containing one part of oil in two hundred parts of water may be prepared by the use of ultrasonic waves obtained from a quartz crystal 40 mm. in diameter and 6 mm. thick. Such emulsions were stable for a week. The natural frequency of the crystal was 450 kilocycles and the exciting voltage was 2 kv. The actual sound power developed was about 4 watts per sq. cm. and the size of the oil particles produced was 1 micron. In flotation experiments using chalcopyrite an 89.9 per cent recovery was obtained in 5 minutes compared with 15 minutes in the case of conventional frothers. In the case of galena 100 per cent recovery was obtained in 10 minutes compared with a 62.8 per cent recovery by the conventional method. It

is suggested that magneto-striction generators or sirens may be used commercially. (*Science Repts. Research Insts. Tohoku Univ.* Ser. A, 2, 925, 1950).

Electronic Devices to "Sound" for Oil

It has been announced from Calgary, Canada, that the president of the new Continental Oil Co. of Canada Ltd., has told the company's board that he hopes it may prove feasible with new sensitive electronic devices to "sound" scientifically for oil with less speculative drilling than is used at present. However, the president added that it had not yet been determined that radio waves could be applied to probing the earth's crust.

A statement by the company, giving these details, said that the president plans to continue research in this type of exploration on the company's holdings, which include some 400,000 acres in the highly-developed Alberta fields, another 1,000,000 acres in Saskatchewan, and more than 150,000 acres in British Columbia. The company, through a wholly-owned subsidiary, also had a property in Texas, where there were 36 producing wells and 35 sites to be developed.

New Conveyor Belt Weighing System

The development of a new conveyor belt weighing system capable of electronically adding, subtracting and recording the tons per hour of material delivered to one or more points has been announced in America. The new belt system, developed jointly by the Trans-Weigh Co., and the Industrial Division of the Minneapolis-Honeywell Regulator Co., is applicable for belt-conveyed materials ranging from low-grade ore to refined sugar. The system continuously weighs material being delivered and provides running measurements of tonnage as well as the total tonnage delivered over a period of time. These measurements can be transmitted over a considerable distance either to a foreman's office or to a central control panel board. Chart records are also automatically maintained.

If one large belt supplies other belts at different places along its length, the system can add and subtract to measure the quantity supplied to any or all belts. The new system can also control the blending of several different materials on the belt.

Aluminium Electrodeposited at Room Temperature

A new type of organic plating bath, developed by the National Bureau of Standards, Washington, United States, electrodeposits aluminium at room temperature according to a notice in *Steel*. The bath is expected to find important uses in electroforming and for the application of thin protective coatings and produces a dense, pure, ductile coating. The new bath is being studied in addition for the possible deposition of molybdenum, tungsten, titanium and zirconium.

The bath is prepared by adding either lithium hydride or lithium aluminium hydride to an ethyl ether solution of anhydrous aluminium chloride. The ether should be anhydrous and alcohol-free, but the concentration of the aluminium chloride is not critical, and may vary from 1 to 4 molar. Current densities may be as high as 4 or 5 amps per sq. decimeter. If thick deposits are required, the current density should not be greater than 2 amps per sq. decimeter.

The bath used for the experiments was hermetically sealed. With anodes of aluminium passing through the lid, the objects to be plated being introduced and removed through a central hole which is ordinarily kept closed with a rubber stopper. If it be hermetically sealed, the bath will keep for several weeks.

No agitation of the bath is necessary. In fact, a quiescent bath is advantageous, because the sediment from the anodes settles to the bottom of the vessel, making bagging of the anodes and filtration of the solution unnecessary. It is vital to use the correct amount of lithium hydride. If the content is too low, the deposits become hard, brittle and grey. Ordinary deposits, 0.01 in. or more thick, are visibly crystalline, but this effect can be reduced somewhat by adding a small amount of dichloroethyl ether. Pitting, which frequently occurs in aqueous baths, is practically non-existent in the ether bath.

Company Shorts

"Tanks" Earn More and Pay More.—The consolidated profit and loss account of Tanganyika Concessions for the year to July 31 last showed total income at £2,097,373 (£1,272,302), of which £1,276,645 (£959,795) was received from its holding in Union Minière du Haut Katanga. The two chief revenue bearing items comprising the gross income figure were £321,383 (nil) received on its holding of Benguela Railway income debentures, and £399,221 (£292,865) received from U.M.H.K. in royalty payments. After providing for all charges, including S. Rhodesian taxation liabilities of £150,000 (£3,300), group net profit was £1,827,390 compared with £1,101,676. The total distribution for the year was raised from 25 per cent to 40 per cent on the 10s. stock units which absorbed a total of £1,296,994 (£722,282) leaving the carry forward at the financial year-end much stronger at £809,790 compared with £279,394.

Sir Ulric Alexander is chairman. The annual meeting will be held in Salisbury, S. Rhodesia on January 22. A further note on the accounts under review will appear in our issue of January 2.

Lake George Distribute 90 Per Cent.—The consolidated profit and loss account of Lake George Mining Corporation showed that after providing for all charges, including tax liabilities totalling £694,623 (£600,687), net profit of the group was £389,727 compared with £291,404. The total dividend distribution was raised from 70 per cent to 90 per cent per 5s. share which absorbed £262,238 compared £208,125. The group profit carried forward at the financial year-end was £226,921 compared with £169,032.

Sir Godfrey Fell is chairman. The annual meeting will be held in London on January 13. A further note on the accounts under review will appear in our issue of January 2.

No Assessment Yet Possible of Kansanshi's Potential.—Rhodesia-Katanga have issued a progress report on the Kansanshi mine to October 31 last. This states that the copper deposits at Kansanshi are entirely different from those of the established mines of the Copperbelt, whose deposits are found in a relatively simple ore structure whereas those at Kansanshi are of a much more complicated nature. This precludes the possibility of proving a large ore reserve tonnage with a few boreholes.

The prospecting operations now in progress fall under two headings—underground exploration and diamond drilling from the surface. The first object of the underground exploration programme is to re-enter and re-sample the old workings as far as possible. At the date of the progress report—October 31 last—480 ft. of check sampling had been carried out which showed virtually all the copper in oxidized form, much of it appearing as copper silicate, which is not amenable to concentration by flotation.

Diamond drilling operations at October 31 had exposed nothing of interest, but drilling is being continued.

The consulting engineers state that there is no immediate prospect of an early assessment of the potential value of the property and that this will not, in all probability, be possible until the end of 1955 when the extensive programme of underground exploration and surface drilling has been completed.

Malayan Tin Dredging Pays More.—Malayan Tin Dredging in a preliminary statement has announced the payment of a final dividend of 6d. per share per 5s. share, making, with the four interims already paid a total of 4s. 3d. equivalent to 85 per cent for the year to June 30 last, compared with a total of 25 per cent for the previous year. The total payment required £10,250 (£26,750). The much improved dividend distribution reflects the big jump in production to 1,127 tons compared with only 316 tons in the preceding year.

The net profit, after all charges including taxation, amounted to £208,008 against £93,159 previously.

Mr. E. V. Pearce is chairman. The adjourned annual general meeting will be held on January 29.

Southern Malayan Tin Pays 20 Per Cent More.—Southern Malayan Tin Dredging in a preliminary statement has announced the payment of a final dividend of 6d. per 5s. share, making, with the four interims already paid a total of 6s., equivalent to 120 per cent compared with 100 per cent for the previous year. The total payment required £272,475 (£231,588). Southern Malayan's tin output for the year to September 30 last at 2,816 tons also showed an improvement over the previous year when 2,472 tons were produced.

Net profit, after all charges including taxation, was £448,353 compared with £498,530. Mr. E. V. Pearce is chairman. The adjourned annual general meeting will be held on January 29.

Siamese & Bangrin Confirm Arrangements With Rio Tinto.—At the Extraordinary General Meeting of Siamese Tin Syndicate and Bangrin Tin Dredging held on December 17 last, it was decided to confirm the provisional arrangements already made with Rio Tinto, referred to in our issues of November 7 and December 5, and to proceed, in conjunction with that company, with the plans for the development of the Leadhills and Wanlockhead properties.

Frontino Ore Reserve Position Serious.—A progress report issued by Frontino Gold Mines for the ten months ended October 31 last states that the Silencio mine in Colombia is in a serious position in that the "present ore reserves will, in the absence of any major discovery of ore, be sufficient for only about three more years of profitable working."

Prospects of a major ore discovery, in the opinion of the company's consulting engineers, rest on the development of the Manto vein which, it is thought, constitutes the most likely major source of any body of ore within Silencio. This area is known as the 280 N. Manto area and while it is being explored there appears to be no reason, the announcement states, why the company should not continue to operate profitably.

South Kalgurli: Dividend to be Considered After Year's Results Available.—South Kalgurli Consolidated have announced that in view of the reduced profits for the financial year to date, the directors have decided to await the results for the full year to March 31, 1953, before considering the payment of a dividend.

Witgold Return of Capital.—Witwatersrand Gold Mining Co. has recommended that a further return of capital be made to shareholders at the rate of 1s. 6d. per share out of the proceeds of sales of property and township stands. This would absorb the sum of £35,222 and would reduce the capital of the company to £375,700 divided into 469,625 shares of 1s. each.

An extraordinary meeting will be held in Johannesburg on December 30 to consider the necessary resolutions. Court confirmation will also be required.

Lahat Mine Resumes Production.—Lahat Mines has announced that the removal of the large quantities of sand and debris which slid into the mine, about which the shareholders were informed on November 12 last, is in progress and that production has now been started on a small scale.

Rhodesia Monteleo's Maiden Report.—Rhodesia Monteleo Asbestos was registered in Southern Rhodesia in July, 1951, and acquired the chrysotile asbestos claims known as the "Slip Mine" near Shabani, Southern Rhodesia, subject to the payment of a percentage royalty to New Monteleo on the selling price of the asbestos fibre produced.

During the year to June 30 last extensive development was undertaken on the company's property with encouraging results and a large stockpile of ore is now available for milling. It is anticipated that the mine will be in full production in Jan. 1953.

The annual meeting will be held in Salisbury, Southern Rhodesia, on December 30. Mr. J. Robinson is chairman.

New Vaal River Announces Further Loss.—A net loss of £12,238 plus a tax liability of £8 was incurred by New Vaal River Diamond and Exploration Co. during the year ended June 30 last against a net loss of £8,048 in the preceding year. The debit balance carried forward has therefore increased from £35,998 to £48,244.

The annual meeting will be held in Johannesburg on Dec. 31. Mr. G. H. R. Edmunds is acting chairman.

Kern Oil Raises Dividend.—Kern Oil in a preliminary statement have announced a dividend for the year to May 31, last of 15 per cent (12½ per cent) and a bonus of 5 per cent (same) which absorbed a net amount of £126,394 against £110,595.

The net profit, subject to audit, after providing £188,905 (£161,432) for depreciation and £344,998 (£421,771) for taxation, was £266,796 compared with £242,472 previously. In this connection, the announcement states that the charge for taxation was made after crediting a net amount of £20,935 (debit £16,066) in respect of adjustments for the past years. The general reserve, which was reduced by £200,625 by the last bonus issue, has been restored to £500,000 by the transfer of £54,693 from the profit and loss account and £145,932 from taxation over-provided and from other credits. A dividend of 15 per cent (10 per cent) was received during the year from Kerri (Trinidad) Oilfields and is included in the above figures. The carry-forward at the financial year-end was £288,698 compared with £209,899 brought in. The net profit of the group, subject to audit, after charging £332,839 (£289,542), for depreciation and £376,339 (£436,099) for taxation, was £340,475 against £279,008 in the preceding year.

NEW UNION GOLDFIELDS LTD.

(Incorporated in the Union of South Africa)

CHAIRMAN'S REVIEW

Presiding at the Fourteenth Ordinary General Meeting of shareholders of New Union Goldfields Ltd., held on December 15 in the Board Room, New Clever House, 31, Simmonds Street, Johannesburg, Mr. H. A. Mackay, acting chairman of the company, said in the course of his address to shareholders, that while during the period under review few opportunities presented themselves for the profitable realization of shares on the Stock Exchange, the decline in Stock Exchange prices had enabled the Company to strengthen its control over various of its associated enterprises at considerably lower cost than seemed likely in June of last year. Shareholders would be aware from the detailed lists of shareholdings published during the Judicial Management period that the control position in relation to certain associated companies was weak, and in fact the administration of some important companies was lost during those years by reason of this lack of effective share control.

INVESTMENTS

During the period covered by the accounts now before you, your board set about the task of correcting this vulnerable position, and this is evidenced by the expenditure of some £578,000 on the purchase of shares in associated and subsidiary companies to which reference is made in the directors' report. This policy of consolidation is being continued, and has largely influenced your board in departing from the practice of the Judicial Managers of periodically publishing a detailed schedule of your company's shareholdings. Your board considers that under existing circumstances, the publication of this information would be detrimental to the best interests of shareholders.

THE MINING INDUSTRY

The most important section of your group's share portfolio is still the one which embraces the gold mining industry. Your company's direct holdings are principally in developing and exploratory companies operating in the Orange Free State Goldfield area, and, naturally, none of these companies are as yet paying dividends. Moreover, while they are still in the developing stage, there continue to be fresh calls for additional capital to bring the mines to a profit earning status, and it is therefore necessary for companies such as yours to keep their resources liquid in order to maintain their stake in the ultimate capitalizations of the projects. While this constitutes a severe drain on cash resources, with little or no immediate return by way of dividend income or interest, your board believes that the faith and patience required of shareholders in these undertakings will be rewarded in a few years' time in a manner commensurate with the risk involved. Nevertheless, until that time is reached, you, as shareholders of this company will need to bear in mind the fact that a large proportion of your share portfolio is not income-producing, and that no material improvement in this aspect of your Company's affairs is likely to occur in the immediate future.

LARGE STAKE IN ORANGE FREE STATE

From the information published by the company from time, you will be aware of the large stake that the New Union Group has in the Orange Free State by way of share investments, mineral rights, land and other interests. Taken collectively, these Orange Free State interests constitute our group's most important asset, and accordingly, the successful outcome of the great developments taking place in this field will be of the greatest importance to your company and its associated companies.

In recent months investors have been told by a number of the leaders in the mining industry of the careful planning and sustained effort which has been called for to achieve the results so far attained; not only has more than £100,000,000 of share and loan capital had to be raised or covered by financing arrangements—substantial part having been obtained under adverse market conditions—but many technical difficulties have had to be overcome. That the new field has gone ahead in the manner and at the pace that it has is a clear indication of the industry's confidence in the future of the Free State, and I think that the foresight and courage exhibited by those on whose shoulders the main responsibility has so far rested have shown that the pioneering spirit associated in the past with mining in South Africa is still a live and driving force.

The long, initial period of continuous capital outlay without any compensating return from gold won, now appears to be drawing to an end, and the production stage in the case of two mines has been reached. Against this background of progress and achievement, I believe that shareholders in this company may view with justifiable confidence the ultimate success of their participations in this important field of investment.

Your Company's interests in producing gold mines are held principally through affiliated financial companies, and the four producing mines which go to make up the largest part of the

investment in this field are Blyvoortzicht Gold Mining Co. Ltd., Village Main Reef Gold Mining Co. (1934) Ltd., Eastern Transvaal Consolidated Mines Ltd. and West Driefontein Gold Mining Co. Ltd.

Your Company's diamond interests are held through the subsidiary company—Selected Mining Holdings Ltd., whose holdings in the operating diamond mining company—Star Diamonds (Proprietary) Ltd., and in the developing company, Westar Diamond Mining Co. Ltd., are referred to in the Directors' Survey of Interests. The Star Mine has been on a dividend-paying basis for some years, and present indications are that the extension of the fissure into the adjacent Westar property will yield payable quantities of diamonds of good quality, if somewhat small.

LIQUID POSITION

At June 30, 1952, current assets amounted to £282,881, and exceeded current liabilities by some £196,500, of which excess £153,400 was represented by cash at bank and on short call. This amount of working capital is regarded by your directors as being by no means excessive, particularly in view of your Company's substantial direct and indirect shareholding in Harmony Gold Mining Co. Ltd., which company, it has been reported, will require further capital during the second half of next year in order to bring the mine to the production stage.

CLAIMS BY AND AGAINST THE COMPANY

The Chairman went on to say that it was a source of satisfaction to the Directors that it was found possible during the year to settle certain of the larger contested claims by and against the Company. The removal of the encumbrance of those contingent liabilities over part of the Company's assets gave the directors a freer hand in planning for the future, and the withdrawal of three of the Geofries' shares claims removed a handicap which had been particularly burdensome to the Company for a long time past.

PROFITS, RESERVES AND PROVISIONS

The net profit for the period June 8, 1951, to June 30, 1952, was £57,200 as opposed to £44,000 for the preceding period July 1, 1950, to June 7, 1951. The Chairman pointed out that a company such as New Union Goldfields Ltd. required a strong reserve position, and accordingly the directors have this year strengthened the Reserves and Provisions of the Company by appropriating a net sum of £431,366 out of past accumulated profits and from share premiums received. At June 30, 1952, free revenue reserves totalled £260,000, the Contingencies Reserve stood at £290,000, and provisions against diminution in value of particular assets amounted to £1,000,000, the last named figure including £900,000 in respect of shareholdings.

NEW PROPOSITIONS

The Chairman went on to say that during the past year the Consulting Engineers' department of New Union Goldfields Ltd. had investigated a large number of new propositions both in the Union and in Southern Rhodesia and it was the Board's policy to devote time and money to this important work. Progress might appear to have been slow but steady, systematic exploratory work was going on all the time and he was confident it would yield good results in the future.

In conclusion the Chairman said:—

"We have experienced difficulties and setbacks, but nevertheless have made appreciable progress since this time last year. While I do not anticipate any very radical improvement in the financial and/or profit position of your Company during the current year, I do expect that further and perhaps more obvious headway will be made towards the rebuilding of your Company into a successful enterprise."

The report and accounts were unanimously adopted.

DIVIDENDS

- Ayer Hitam Tin 1s. 3d. i (Jan. 20)
- Blyvoortzicht Gold Mining 1s. 6d. (Feb. 5)
- Crown Mines 2s. 6d. (Feb. 5)
- De Beers Industrial Corporation 2s. (Jan. 28)
- De Beers Consolidated Mines 10s. (Jan. 28)
- Durban Roodepoort Deep 2s. (Feb. 5)
- East Rand Prop. 2s. 6d. (Feb. 5)
- Frontino Gold Mines Pref. 1s.; Ord. 6d. i (Jan. 1)
- Geldenhuys Deep 1s. (Feb. 5)
- Idris Hydraulic Tin 6d. i (Jan. 16)
- Kepong Dredging 3d. i (Jan. 7)
- Rand Mines 3s. (Feb. 5)
- Rawang Tin Fields 12½% i (Jan. 14)
- Rose Deep 1s. 3d. (Feb. 5)
- Southern Tronoh Tin Dredging 6d. i (Jan. 9)
- Sungei Besi Mines 7 1/5d. i (Jan. 22)
- Tronoh Mines 1s. 6d. i (Jan. 13)

i interim

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TRANSFER OF CONTROL APPROVED

The Forty-First Ordinary General Meeting of the Company was held at Winchester House, London, E.C.2, on December 19.

The following is an extract from the Statement by the Chairman (Mr. A. P. Faickney) which was circulated with the report and accounts:—

In my Statement last year I described the arrangement whereunder the oil interests in Burma of The Burmah Oil Co. Ltd., the Indo-Burma Petroleum Co. Ltd., and your Company are merged in an operative partnership managed by The Burmah Oil Co. Ltd., in which your Company holds a 2½ per cent interest. I referred also to the negotiations in progress with the Burmese Government with a view to its participation in the industry operated by the above-mentioned Merger of the three Oil Companies. I would not say that these negotiations have made no progress since my Statement last year, but they have unquestionably suffered from upsets and hitches which make it impossible for me to say they are approaching finality.

No progress was possible during the year with the suit which your Company had to bring against the Burmese Government in order to safeguard your Company's legal rights to compensation for the destruction of its assets in Burma as a war measure ordered by the then Government of Burma, and the position still is that your Company has received no compensation for the destruction of its assets as a war measure ordered by the then Government of Burma, apart from the *ex gratia* payment by Her Majesty's Government referred to in previous Reports.

The Company's policy in the face of a difficult situation in Burma has been consistently inspired by three necessary and prudent objectives, firstly, to preserve as much as possible of your Company's interests in Burma, secondly, to keep its capital commitments in Burma down to the minimum, and thirdly, to effect the utmost economy in its expenditure in Burma. Your Company's participation in the Merger secured the first of these objectives, and has been endorsed at successive General Meetings.

Thus far I have considered the Company's position in relation to its Burma interests, and before passing from this aspect I wish to inform Shareholders that your Directors, recognizing that these interests have through unavoidable circumstances shrunk to small proportions and that is advisable to free your Company from any avoidable liability connected with these interests, decided that the outstanding 5½ per cent Debenture Stock of the Company should be redeemed.

I now turn to consider your Company's interests in South Africa, where during and since the war it has embarked on and expanded industrial activities through the medium of its wholly-owned subsidiary British Burmah Petroleum Co. (South Africa) (Pty) Ltd., which holds substantial interests in the Anglo Transvaal Consolidated Investment Co. Ltd., South African Torbanite Mining & Refining Co. Ltd., and Masonite (Africa) Ltd., all of which have paid satisfactory dividends for their latest accounts year. In addition our subsidiary holds the Managing Agencies of South African Torbanite Mining & Refining Co. Ltd., and of Colas, South Africa, Ltd. In the absence of unforeseen circumstances our South African subsidiary should continue to earn a reasonable profit.

The profits accruing from Burma and from your Company's South African subsidiary, which constitute the sources of your Company's income, are subject to double taxation and substantial financial benefit can be gained by obviating the remittance to the United Kingdom of dividend accruing from our South African subsidiary.

A realistic view of all these facts and considerations suggests that the administration of your Company should be transferred from the United Kingdom to the Union of South Africa, and your Directors recently obtained the concurrence of Her Majesty's Treasury to that transfer, and have in the notice convening the General Meeting included an intimation that a Resolution that the management and administration of the Company be transferred to the Union of South Africa will be submitted for the approval of the Shareholders, in which event the Company's affairs will be vested in a Board of Directors to be constituted in South Africa and the Board of Directors in London will cease to exist.

I am confident that the Shareholders will endorse these changes in your Company's administration which are conclusively justified by the predominance of your Company's South African interests, by the saving of expenditure which they will enable, and by the benefit to your Company in relief from double taxation, the combination of these facts and circumstances offering prospects of declaring dividends to the Shareholders.

The report and accounts were adopted, and the resolution to transfer the management and control of the Company to South Africa was approved.



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UNION FREE STATE COAL & GOLD MINES LTD.

(Incorporated in the Union of South Africa)

Directors:

T. Reekie (Chairman), P. H. Anderson, W. M. Frames, W. H. A. Lawrence, H. A. Mackay, T. C. A. Meyer, G. V. R. Richdale, N. E. Rosenberg, Q.C., M. M. Sacks.

Alternate Directors:

R. E. M. Blakeway, E. J. F. Harrington, P. Heimann, L. P. Kent, A. C. Langebrink, D. D. McIlwowie, M. Zimmerman.

NOTICE OF EXTRAORDINARY GENERAL MEETING

NOTICE IS HEREBY GIVEN that an Extraordinary General Meeting of Union Free State Coal & Gold Mines Ltd. will be held in the Board Room, Second Floor, The Corner House, Johannesburg, on Wednesday, January 14, 1953, at 11 a.m., for the purpose of considering and, if thought fit, of passing, with or without modification, in the manner required for the passing of a Special Resolution in terms of the Companies Act, 1926, as amended, of the Union of South Africa, the following resolutions as Special Resolutions, namely:—

1. That the Company be wound up voluntarily in terms of Section 160(b) of the Companies Act, 1926, as amended.
2. That Thomas Reekie, Peter Hamilton Anderson, Eric John Francis Harrington, Ralph Elliot Murison Blakeway, Ernest Burnham, Denis David McIlwowie, John Hare, Morris Zimmerman and Vernon Kuzel be and are appointed Liquidators in the voluntary winding-up, with all such powers and authorities as are allowed in law, and particularly without prejudice to the generality of the aforesaid with the following special powers, namely:—
 - (a) To carry on the business of the Company so far as may be necessary or advisable in the discretion of the Liquidators, for the beneficial dealing with the Company's property and the realization and/or distribution of the assets of the Company.
 - (b) To distribute in specie to shareholders on a *pro rata* basis any or all of the shares or other securities or investments held or to be acquired by the Company; to deal with and dispose of any shares or fractions of shares arising from such distribution and to distribute the net cash proceeds thereof among the shareholders entitled thereto.
 - (c) To sell or otherwise dispose of the whole or any part of the undertaking, Raleigh Colliery and any mineral rights, mineral leases, freehold, leasehold, movable and immovable property, prospecting claims, option and prospecting contracts and any other property of the Company by public auction or private treaty or by tender or in such other manner as they may deem most beneficial with power to transfer the same to any person or company acquiring the same.
 - (d) To appoint and remunerate Auditors, Secretaries, any agent or agents and any person or persons for clerical, secretarial or other assistance; to pay all necessary and reasonable expenses incurred in connection with the winding-up of the Company and to destroy all books, papers and records after the expiry of two years from the date of dissolution of the Company.
 - (e) To do all such other acts, matters and things as may be necessary for the proper carrying out of any of the above powers or for completing the business of the Company and the beneficial winding-up thereof.
- The powers hereby given to be exercised by any number of the Liquidators not being less than three, shall be held in full power and delved in his/her/their name from time to time to some other person.
3. That the Liquidators shall receive as remuneration for their services the sum of £1,500 to be divided among them as may be agreed, or failing agreement equally, provided that, should the Liquidators desire to serve without remuneration, no remuneration shall be payable.
4. That the security which the Liquidators are required to furnish to the Master of the Supreme Court for the due performance of their duties be dispensed with in terms of the proviso to Section 165(2) of the Companies Act, 1926, as amended.

The Transfer Books and Register of Members will be closed from January 8 to 14, 1953.

In the event of the Company not being placed in voluntary liquidation, the Transfer Books and Register of Members will re-open on January 15, 1953.

Should the Company be placed in voluntary liquidation the Books will nevertheless be re-opened to permit dealings in the Company's shares to continue for a further period of a month or two. The final date of the closing of the Books will be announced later.

By Order of the Board,

London Office: A. MOIR & CO.,
4, London Wall Buildings, E.C.2. London Secretaries.
December 19, 1952

MINING ENGINEER or SENIOR MINES FOREMAN
age bracket 28-42 for Middle East. Preferably (but not essentially) technical graduate. Underground experience in flat-bedded ore deposits would be advantageous. Must be hard worker with initiative and ability to organize. Good salary and prospects to right man. Two year contract, renewable if satisfactory. Pension Fund, married accommodation available, 1st class passages including family, healthy climate, resident doctor. Write giving age, marital status, fullest details, experience and references to Messrs. Pannell, Crewdson & Hardy, 9 Basinghall Street, London, E.C.2.

Mining Men and Matters

Mr. Cyril Joseph Burns has been elected a director of Gold Coast Selection Trust.

Mr. W. A. Coates has been appointed general sales manager and **Mr. F. Gurney** manager home sales of Metropolitan-Vickers Electrical Co. Mr. Coates, who succeeds the late Mr. Duncan MacArthur, retains his seat on the board.

Mr. Richard Crawford has been appointed managing director of Mines Safety Appliances in succession to **Mr. Albert J. Toering**. Mr. Toering who established the business is returning to the United States.

Mr. A. M. Chisholm has been elected to the board of Witwatersrand Deep in succession to **Mr. G. H. R. Edmunds** who has resigned.

Mr. P. A. Jousse, of Bulawayo, has been appointed a Director of Rhodesian Corporation.

Mr. Hugh Langford Holt has been appointed to the board of Dowty Mining Equipment Ltd., in succession to Mr. M. Fountain-Barber, who has resigned.

Mr. John McClelland has been appointed a director of Robert Victor Diamonds in succession to **Mr. S. F. Mader** who has resigned.

Mr. H. A. Mackay has been appointed acting chairman of the reconstituted board of Lydenburg Gold Farms.

Mr. H. N. Norbury has joined the staff of Henry Meadows Ltd., as Sales Manager.

Mr. W. H. Townley has been appointed manager of the Liverpool office of the Bank of British West Africa, following the death of Mr. J. W. Blakey, after a short illness, on December 10, 1952.

De Beers Re-opens Bultfontein and Closes Dutoitspan.—De Beers Consolidated Mines have announced that in accordance with the policy of maintaining production from its two mines in Kimberley, and having regard to the needs of the diamond market, it has been decided to restart mining operations at the Bultfontein Mine and simultaneously to close down the Dutoitspan Mine. The change over became effective on December 1.



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